To: Harrison Schmitt, Chair, NASA Advisory Council

CC: Christopher Blackerby, NAC Executive Director
Greg Williams, NAC Executive Secretary
Cassie Conley, NASA HQ
Alan Stern, NASA HQ
Members of the PPS

From: Ronald Atlas, Chair

Regarding: Planetary Protection Subcommittee Meeting, January 28 – 29, 2008

On January 28 and 29, 2008, the NASA Planetary Protection Subcommittee (referred to this report also as PPS) met at the offices of NASA's Jet Propulsion Laboratory, in Pasadena, CA. Below are the minutes of the meeting and recommendations adopted.

**Minutes**

Members in attendance: Ronald Atlas, Gregory Baecher, Nancy Ann Budden, Michael Carr, W. David Carrier III, Gary Lofgren, Richard Off, Susanna Priest, George Robinson, Gerhard Schwehm, Andrew Steele, Michel Viso. Planetary Protection Officer Cassie Conley served as Executive Secretary for PPS.

Highlights of the meeting included John Rummel's report on the Montreal COSPAR workshop earlier in the month; Bob Pappalardo's presentation on the outer planets' icy moons, Dave Beaty's presentation on Mars Sample Return Mission Plans, Margaret Race's presentation on MSR Receiving Facility; Dimitri Papanastassious's presentation on MRF: Archiving Constraints/CAPTEM; John Klein's presentation on the Mars Science Lab; and John Klein's guided tour of JPL, as well as discussions about ethics and planetary protection and about receiving facility issues.

**Recommendations**

Recommendation 1
On the subject of planning for a Mars Sample Return mission and future Outer Planet flagship missions, the Subcommittee recommends that the necessary investments be made to enable the full system ‘microbial reduction’ of spacecraft to meet planetary protection requirements. This will ensure both the integrity of the sample-return itself, and enable a future landing-site decision that would not exclude Mars “special regions” a priori. It would allow a Mars Sample Return mission to respond positively and effectively to a serendipitous discovery of special regions on Mars, or to respond to new insights that may be gained on areas, such as gully regions, that are high priority sites in their own right. System-level ‘microbial reduction’ is also likely to be essential for the implementation of missions to compelling targets such as Europa or Titan.

Recommendation 2
With regard to NASA's efforts in human exploration of other planetary bodies, monitoring and control of microbial contamination on human crewed missions are significantly greater challenges than for robotic missions. Therefore, the Subcommittee recommends that the necessary investments be made to develop efficient and effective systems for monitoring microbial contamination on these missions. Investments should be made in technologies for cleaning and decontamination that will be required for implementation of human exploration missions. NASA should also support the development of international standards in this area.

Recommendation 3
NASA is planning for Mars exploration within an international framework, as reflected in its contributions to the ESA ExoMars mission and the International Mars Architecture for Return of Samples (IMARS). Considering the stated intention of NASA to move forward to culminate key agreements with international partners relating to these missions as well as a future Outer Planets flagship mission, the Subcommittee recommends that NASA:
a) Initiate the study recently recommended by the NAC Science Committee, to be conducted by the US National Research Council, designed to identify the critical questions needing to be resolved surrounding ethical, legal, environmental, and social implications of space exploration. This study should tap a broad spectrum of relevant expertise from the ELSI community, as well as the science and engineering communities.
b) Support and participate in the international workshop being organized by COSPAR to consider these issues. Specifically, we would encourage engaging international groups such as the various national Academies of Science, the International Academy of Astronautics, and other appropriate groups that can provide insights regarding the broader context for and value of space exploration, as well as the active engagement of groups representing the points of view of the non-expert publics.

Recommendation 4
In consideration of current plans for a Mars Sample Receiving Facility, the Subcommittee recommends that the CAPTEM organization chart be expanded to include a person responsible for Mars sample curation and oversight. Furthermore, this person should function as a liaison with the PPS.

Recommendation 5
The Subcommittee recommends that the issue of how much sample is to be returned from Mars, and the allocation of mass to individual samples, should be revisited in consideration of planetary protection requirements for biohazard and life detection testing. Attention should be paid, in updates to the Draft Test Protocol, to subsampling of returned material so as to assure, at an appropriate statistical level, the safety of each sample.

Attachments:
PPS agenda, January 28 – 29, 2008
PPS membership

Planetary Protection Subcommittee
Jet Propulsion Lab, Rm 180-703C, Pasadena, CA

Agenda
January 28, 2008

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| 9:00 am | Welcome and overview | Ron Atlas, Cassie Conley |
| 9:15 am | Outcomes of the Last PPS Meeting | C. Conley |
| 9:45 am | Report on COSPAR Workshop<br>• Special regions<br>• Policy changes<br>• UNESCO and ELSI workshops | John Rummel |
| 10:45 am | Discussion of Planetary Protection Ethics Issues | R. Atlas |
| 12:00 pm | Lunch, Icy Moons and Planetary Protection | Bob Pappalardo |
| 1:00 pm | Mars Sample Return Mission Plans | Dave Beaty |
| 2:00 pm | MSR Receiving Facility: Planetary Protection | Margaret Race |
| 3:00 pm | MRF: Archiving Constraints/CAPTEM | Dimitri Papanastassiou |
| 4:00 pm | Summary of Receiving Facility Issues and Discussion of Next Steps | R. Atlas |
| 5:00 pm | Adjourn for the Day, Dinner | |

January 29, 2008

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| 9:00 am | Overview of the Day | R. Atlas, C. Conley |
| 9:15 am | Lunar and Mars Exploration, Planetary Protection for Humans | C. Conley |
| 10:30 am | Summary of the Issues; Discussion | R. Atlas |
| 12:00 am | Lunch Talk on MERs | John Klein |
| 1:00 pm | Discussion and Findings | R. Atlas |
| 2:00 pm | Tour of JPL | J. Klein |